



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION:	PW1521GA	BYPASS RATIO (-):	11.4
UNIQUE ID NUMBER:	04F20PW198	PRESSURE RATIO π_{co} (-):	35.1
COMBUSTOR:	TALON X, Block-C		
ENGINE TYPE:	TF	RATED OUTPUT F_{oo} (kN):	97.7

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{oo} (mg/kN)	LTO_{num}/F_{oo} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/ F_{oo} AND MAX nvPM _{mass}	10.4	3.94E+14	309
AS % OF CAEP/10 LIMIT	-	-	4.6
AS % OF CAEP/11 LIMIT (InP)	0.4	2.5	
AS % OF CAEP/11 LIMIT (NT)	1.8	5.6	

MEASURED DATA

MODE	POWER SETTING (% F_{oo})	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM _{mass} ($\mu\text{g}/\text{m}^3$)
				EI _{mass} (mg/kg)	EI _{num} (particles/kg)	
TAKE-OFF	100	0.7	0.695	9.8	1.94E+14	
CLIMB OUT	85	2.2	0.576	4.8	1.63E+14	
APPROACH	30	4.0	0.208	0.2	1.57E+13	
IDLE	7	26.0	0.071	0.6	8.03E+13	
LTO TOTAL (kg, mg, number of particles)			265	732	2.77E+16	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ F_{oo} VALUES (mg/kN, particles/kN)				7.5	2.83E+14	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				9.8	1.94E+14	240

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% F_{oo})	CORRECTED EMISSIONS INDICES	
		EI _{mass_SL} (mg/kg)	EI _{num_SL} (particles/kg)
TAKE-OFF	100	13.0	8.53E+14
CLIMB OUT	85	7.0	9.73E+14
APPROACH	30	0.2	6.26E+13
IDLE	7	1.2	6.89E+14

AMBIENT CONDITIONS

	From		To		FUEL	
BAROMETER (kPa)	102.0	103.3	HEAT OF COMBUSTION (MJ/kg)		43.21	
TEMPERATURE (K)	272.0	278.1	HYDROGEN CONTENT (%mass)		13.98	
HUMIDITY (kg water/kg dry air)	0.0012	0.0022	AROMATICS CONTENT (%vol)		18.1	
			NAPHTHALENE CONTENT (%vol)		0.78	
			SULPHUR CONTENT (ppm by mass)		553	

MANUFACTURER:	Pratt & Whitney
TEST ORGANIZATION:	Pratt & Whitney
TEST LOCATION:	Mirabel Aerospace Centre - Quebec
TEST DATES:	25/03/2018-26/03/2018

REMARKS

1. Data from certification report PWA-12245-02
2. Block C combustor
3. nvPM levels in accordance with Annex 16 Vol. II, Chapter 4, Appendix 7 and Appendix 8.
4. Data revised: nvPM EI_{mass_SL} corrected